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single specimen at St. George, Utah. In addition to my former note, I have to add that I have since discovered several fruiting specimens of *Tricardia* at Hawthorne and Candelaria, Nevada. The plant occurs sparingly along the eastern base of the Sierras, from Reno to the southern boundary of Nevada.

Salt Lake City, July 24.

MARCUS E. JONES.

**Botanical Notes.**—*The Colors of Flowers.*—In an interesting article by Grant Allen, in *Nature*, on 'The Colors of Flowers, as illustrated by the British Flora,' the author says :

The different hues assumed by petals are all, as it were, laid up beforehand in the tissues of the plant, ready to be brought out at a moment's notice. And all flowers, as we know, easily sport a little in color. But the question is, do their changes tend to follow any regular and definite order? Is there any reason to believe that the modification runs from any one color towards any other? Apparently, there is. All flowers, it would seem, were in their earliest form yellow; then some of them became white; after that, a few of them grew to be red or purple; and, finally, a comparatively small number acquired various shades of lilac, mauve, violet, or blue.

Some hints of a progressive law in the direction of a color-change from yellow to blue are sometimes afforded us even by the successive stages of a single flower. For example, one of our common little English forget-me-nots, *Myosotis versicolor*, is pale yellow when it first opens; but as it grows older, it becomes faintly pinkish, and ends by being blue like the others of its race. Now, this sort of color-change is by no means uncommon; and in almost all known cases it is always in the same direction, from yellow or white, through pink, orange, or red, to purple or blue. Thus, one of the wall-flowers, *Cheiranthus chamaeleo*, has at first a whitish flower, then a citron-yellow, and finally emerges into red or violet. The petals of *Stylidium fruticosum* are pale yellow to begin with, and afterwards become light rose-colored. An evening primrose, *Oenothera tetraptera*, has white flowers in its first stage, and red ones at a later period of development. *Cobaea scandens* goes from white to violet; *Hibiscus mutabilis* from white through flesh-colored, to red. The common Virginia stock of our gardens (*Malcolmia*) often opens of a pale yellowish green; then becomes faintly pink; afterwards deepens into bright red, and fades away at last into mauve or blue. Fritz Müller noticed in South America a *Lantana*, which is yellow on its first day, orange on the second, and purple on the third. The whole family of *Boraginaceae* begin by being pink, and end by being blue. In all these and many other cases the general direction of the changes is the same. They are usually set down as due to varying degrees of oxidation in the pigmentary matter.

If this be so, there is a good reason why bees should be specially fond of blue, and why blue flowers should be specially adapted for fertilization by their aid. For bees and butterflies are the most highly adapted of all insects to honey-seeking and flower-feeding. They have themselves on their side undergone the largest amount of specialization for that particular function. And if the more special-

ized and modified flowers, which gradually fitted their forms and the position of their honey-glands to the forms of the bees or butterflies, showed a natural tendency to pass from yellow through pink and red to purple and blue, it would follow that the insects which were being evolved side by side with them, and which were aiding at the same time in their evolution, would grow to recognize these developed colors as the visible symbols of those flowers from which they could obtain the largest amount of honey with the least possible trouble. Thus it would finally result that the ordinary unspecialized flowers, which depended upon small insect riff-raff, would be mostly left yellow or white; those which appealed to rather higher insects would become pink or red; and those which laid themselves out for bees and butterflies would grow for the most part to be purple or blue. Now, this is very much what we actually find to be the case in nature.

*The Variability of Oaks.*—In some remarks upon a note by Mr. Meehan, on 'Hybrid Oaks,' which appeared on page 55 of the BULLETIN, M. DeCandolle (*Arch. des Sci. Phys. et Nat.*, p. 557) says that it is interesting to find that in a *Quercus robur* raised in America, a country to which the species is not indigenous, and one in which no allied form exists to cross with it, the same mixture of forms has been observed that he called attention to in 1862, when he reduced the so called species *Q. pedunculata* and *Q. sessiliflora* to *Q. robur*. M. DeCandolle remarks that "many similar facts have been noted in annual or perennial plants introduced into cultivation, and no one, it seems to me, can doubt that variations sometimes occur without hybridization."

### Botanical Literature.

*Sylloge Fungorum omnium hucusque cognitorum.* By Prof. P. A. Saccardo. Large 8vo., pp. 768. Padua, Italy.

The first volume of this long-expected work has at length appeared, and will help to fill a want long felt by all students of mycology. It forms a large octavo of 768 pages, with descriptions of about 2,900 species of Sphaeriaceous Fungi. Adding much to the practical value of the work are the *habitat lists*, giving in alphabetical order the names of the trees and plants on which the different species grow. The volume is published at 49 francs, which, considering the labor of preparing such a work, is very reasonable. It is to be hoped that the demand for this first volume may be such as to encourage the author to go on with the compilation of the remaining orders.—J. B. E.

### BOOKS AND PAMPHLETS RECEIVED.

*Index to the Genus Carex of Gray's Manual.* By Jos. F. James. 8vo., pamph., pp. 11. (Reprint from the *Botanical Gazette*.) From the author.

*Contributions to the Flora of Iowa.* Nos. iv. and v. By J. C. Arthur. 8vo., pamph., pp. 4 and 5. (Extracts from *Proceedings* of the Davenport Acad. Sci.) From the author.

*Darwin considéré au point de vue des causes de son succès et l'import-*